Subgradient

Nipun Batra

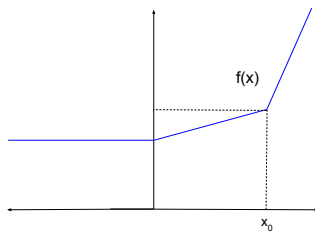IIT Gandhinagar

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- ▶ Generalises gradient to convex but non-differentiable problems
- ▶ Examples:

Subgradient

▶ Generalises gradient to convex but non-differentiable problems
▶ Examples:
  ▶ $f(x) = |x|$

▶ TASK: find derivative of $f(x)$ at $x = x_0$

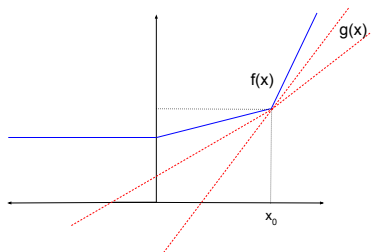# Solution

▶ Construct a differentiable $g(x)$
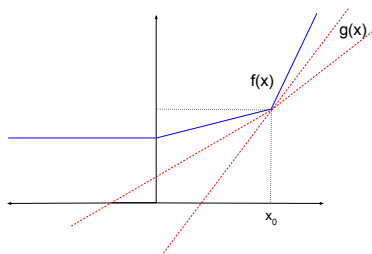 ▶ Intersecting $f(x)$ at $x = x_0$

Solution

- Construct a differentiable $g(x)$
  - Intersecting $f(x)$ at $x = x_0$
  - Below or on $f(x)$ for all x

Solution

- Compute slope of $g(x)$ at $x = x_0$

▶ Subgradient of $f(x)$ belongs to $[-1, 1]$